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# Agricultural Biotechnology Support Project (ABSP)

## Impact Report

July 1, 1999 – July 31, 2000

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**Contact:** Dr. Catherine L. Ives  
Director, ABSP  
Institute for International Agriculture  
319 Agriculture Hall  
Michigan State University  
East Lansing, MI 48824  
Tel: (517)-432-1641  
Fax: (517)-353-1888  
Email: [ivesc@msu.edu](mailto:ivesc@msu.edu)



# ABSP Annual Impact Report

July 1, 1999 – July 31, 2000

## INTRODUCTION

This report outlines the accomplishments and impacts of the Agricultural Biotechnology Support Project (ABSP) [DAN-A-00-00126-00, 263-0240-G-00-6014-00] for the period from July 1, 1999 through July 31, 2000. The impacts are listed according to the stated goals of the project as given below.

### **Primary goal:**

To improve the capacity and policy environment for the use, management and commercialization of agricultural biotechnology in developing countries and transition economies.

This goal is achieved by meeting the following objectives:

### **Objective 1**

Establishment of a policy framework in developing countries and transition economies which promotes the use, management and commercialization of biotechnology by both host country and multinational agribusiness and research institutions.

### **Objective 2**

Improvement of marketed crops through strategic research partnerships between the U.S. and developing country public and private sectors.

## OBJECTIVE 1

**The establishment of a policy framework in developing countries and transition economies which promotes the use, management and commercialization of biotechnology by both host country and multinational agribusiness and research institutions.**

### □ Policy impacts in Indonesia

- **Impacts on Food Safety.** Supported by ABSP, Dr. Muhammed Herman and Dr. Achmad Hidayat, Central Research Institute for Food Crops (CRIFC), attended the International Food Safety course at Michigan State University (MSU) from July 11-16, 1999. Drs. Herman and Hidayat were subsequently appointed to the committee charged with drafting Food Safety Guidelines for GMOs in Indonesia. These guidelines have been approved by the Ministry of Agriculture and other relevant ministries in Indonesia.
- **Impacts on technology transfer and intellectual property (IP).** Through training and technical assistance from ABSP, the Administration for Agricultural Research and Development (AARD; equivalent to the Agricultural Research Service/USDA) established a new office of Intellectual Property and Technology Transfer in Bogor, Indonesia, July 1999. The ABSP office trained two staff members in various issues of IP management and technology transfer. The KIAT office, as it is known, is now actively involved in educating the scientists and policy makers in Indonesia in management of IP. KIAT is also working with the private sector to license technologies generated within AARD institutions. The AARD is one of the few developing country institutions to recognize the benefits of intellectual property and to develop within the ministry a system for protecting and exploiting Indonesian innovations to benefit Indonesian agriculture.

In addition, the Indonesian Parliament is still considering passage of a revised Plant Variety Protection (PVP) law. Researchers trained by ABSP have been working with the Minister of Agriculture to educate the Parliament about the law and it is hoped that the law will be approved by early 2001.

- **Impacts on public awareness/acceptance.** Over the past five to six years, ABSP has assisted a number of CRIFC faculty and staff in both biotechnology technical training and in regulatory and intellectual property policy training. This training has provided the researchers at CRIFC with sound scientific knowledge to engage in current biotechnology education and awareness campaigns throughout Indonesia. Teams of scientists recently traveled in Central Java, West Java and Bali to present seminars on the genetic engineering for crop improvement and Indonesia's regulatory system for GMOs. The audience was primarily university and research institute personnel. CRIFC plans to expand this effort to include East Java and will conduct training to educate additional scientists on communicating biotechnology issues and policy to the Indonesian public.

### □ Policy impacts in Egypt

- **Establishment of the Technology Transfer Office at Agricultural Genetic Engineering Research Institute (AGERI).** The Office of Technology Transfer and Intellectual Property (OTTIP) at AGERI was established. The internal IP policy was developed and approved. A model Material Transfer Agreement (MTA), a License Agreement and a Confidential Disclosure Agreement were

developed, based on MSU Office of Intellectual Property forms, in both English and Arabic and a comprehensive awareness program for AGERI staff was implemented. This effort makes AGERI one of a only few developing country institutions to adopt policies and procedures for management of intellectual property rights.

- **Adoption of technology transfer policy within the Ministry of Agriculture (ARC).** In addition to developing IP policy at AGERI, the OTTIP has been instrumental in developing an IP policy for the Agricultural Research Center (equivalent to an Agricultural Research Service/USDA policy). The ARC has more than 10 research institutions covering a wide range of agricultural research, including mechanization, pesticide research and horticulture. This ARC policy makes Egypt one of the only developing countries to have developed a government strategy on the management of intellectual property rights in agriculture.
- **Establishment of an Intellectual Property Rights (IPR) Center at Menoufia University.** Through IPR training provided in Cairo in April 1999 for Professor Ibrahim Siddik, Vice President for Community Services, the Menoufia University in Egypt established a new IPR Center in the Faculty of Law. This new Center provides IPR related legal services to the university community. Menoufia University has 17 colleges/institutes with approximately 2,000 faculty members and 60,000 students. The establishment of intellectual property rights services within the university community in Egypt is an important extension of ABSP's efforts to establish IP management expertise and assistance to scientists in the developing world.
- **Assessment for privatization and development of marketing strategy for Agricultural Genetic Engineering Research Institute (AGERI).** In May 1999 and May 2000, assessment teams from the University of California-Berkeley's Haas Business School conducted assessments on the *Commercialization Prospects for AGERI* and *Development of a Strategic Marketing Plan*. The first report indicated that AGERI could not be self-supporting if USAID/Cairo ceased support in 2001. It recommended that privatization plans be slowed down and that AGERI develop appropriate strategic marketing and business strategies in order to meet the challenge of sustainability. From this report, USAID/Cairo initiated discussions and analysis on the establishment of a non-governmental organization (NGO), to be endowed by USAID. This would support advanced agricultural research within Egypt via a competitive grant process similar to the Rockefeller Foundation. This process is currently underway.

The second report, *Development of a Strategic Marketing Plan for AGERI*, is still in draft form. The draft report recommends a focus for AGERI on maize, fruits and vegetables, concentrating on domestic markets for GMOs with an immediate focus on input traits, including abiotic stress. It also indicated that AGERI should expand the services offered by the Genetic Engineering Services Unit (GESU) and develop improved communication strategies with all players in the agricultural sector. The team also indicated that AGERI needs to foster a market-oriented culture, broaden accountability across the organization and formalize IP infrastructure.

- **Development of biotechnology initiative with ASARECA.** ABSP has entered into a formal, contractual collaboration with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). As part of the process to develop a regional initiative in biotechnology and biosafety, ASARECA established a Working Group (WG) to examine issues and pragmatic approaches for integration of

biotechnology through the existing regional networks and for the expansion of regional biosafety regulatory policy development.

- **ABSP technical support.** In order to assist ASARECA, ABSP will provide technical support to the WG throughout the year-long planning process. This will ensure that the WG members have access to international expertise in agricultural biotechnology and biosafety.
- **Inventory report.** As part of the technical support process, ABSP has developed *An Inventory of Agricultural Biotechnology for the Eastern and Central Africa Region*. The draft report highlights the current status of biotechnology applied to crops within ASARECA networks in order to give the WG an indication of the future potential of biotechnology tools for the improvement of crops that are important to Africa.

□ **Intellectual property policy assistance to the Bean/Cowpea CRSP.**

With ABSP assistance and consultation, the USAID-supported Bean/Cowpea Collaborative Research Support Project (CRSP) developed an IP policy – the first time a CRSP project has institutionalized an IP policy with their U.S. and overseas collaborators. The Bean/Cowpea CRSP Technical Committee reviewed the draft policy and it is currently under consideration by the Bean/Cowpea CRSP community. The adoption of a consistent IP policy will assist the Bean/Cowpea CRSP in meeting federal obligations and provide clear guidance on the management of intellectual property rights within the CRSP.

## OBJECTIVE 2

### **Improvement of marketed crops through strategic research partnerships between the U.S. and developing country public and private sectors.**

- **Technology transfer.** ABSP continues to transfer improved materials to collaborating institutions for field-testing and evaluation. In keeping with the goals of ABSP to access, use and manage biotechnology in a safe and legal manner, transfer of materials is conducted via Material Transfer Agreements (MTAs) so that each party understands rights to, responsibilities for, and restrictions to the material. ABSP remains the only international project in agricultural biotechnology to provide assistance in formal, legal transfer of germplasm and constructs. Material moved in 1999/2000 includes the following transfers.
- **Transfer and field testing of B.t Potatoes in Egypt.** In January 2000, under an appropriate MTA, 14 B.t transgenic potato lines were transferred to Egypt for field testing at AGERI and CIP station in Egypt. This was the fourth year of small-scale field trials in Egypt (results and impacts presented below). A detailed plan is currently being developed for commercialization of B.t potatoes in Egypt that will include environmental data to be collected and analyzed, food safety data to be developed and intellectual property issues to be addressed.
  - **Transfer of B.t Potatoes to South Africa.** In December 1999, an MTA was developed to facilitate transfer of 12 B.t transgenic potato lines (tissue culture plantlets) to South Africa for greenhouse and field evaluations. The Agriculture Research Council of South Africa is currently seeking an import permit from the government to obtain these materials from the ABSP potato project at MSU. All the biosafety and IPR legal requirements will be met before the transgenic materials are field-tested in South Africa.

- **Transfer of cucurbits germplasm from U.S. to Egypt.** In March 2000 under an appropriate MTA, Dr. Molly Jahn, Cornell University, transferred 29 lines of squash, melon and cucumber to Egypt. These materials are currently being field tested in Egypt for evaluation against virus diseases.
  - **Transfer and distribution of cucurbits to small and multinational companies worldwide.** The partnership between ABSP and the Vegetable Breeding Program at Cornell University allowed Dr. Molly Jahn to extend the impact of research on cucurbits to smaller companies in developing and developed countries. The multiple disease resistant cucurbit germplasm has been distributed to both small start-up and large multinational companies all over the world, including Egypt, Pakistan, Philippines, Indonesia, South Africa, Jordan, Brazil, India and Turkey.
- **Development of virus-resistant tomatoes in Egypt.** Geminiviruses severely impact horticulture worldwide, especially in the Middle East. The viruses are transmitted by whiteflies and there are currently over 77 known geminiviruses. AGERI researchers have identified two different kinds of whitefly-transmitted geminiviruses (tomato yellow leaf curl virus [TYLCV] and tomato yellow mosaic virus [TYMV]) that infect tomatoes in Egypt. The genome of Egyptian isolate of TYLCV has been cloned, sequenced and compared with other geminiviruses. An infectious TYLCV clone was established and transformed into tomato cultivars that, at the greenhouse level, appear to be resistant to TYLCV infection. The transformed tomatoes carry a cytotoxic gene that is not expressed unless the cell is infected by a whitefly-transmitted geminivirus. This strategy ensures that the virus will not spread to the rest of the plant cells and, therefore, the virus will not develop resistance to the gene product. While still preliminary, these early results are among the first demonstrating control of geminivirus.
- **Virus resistant cucurbits developed.**
- **Progress at AGERI.** In Egypt, cucurbits (melon and squashes) are important horticultural export crops, as well as major sources of nutrition for the Egyptian people. Cucurbit crops can be completely destroyed when they are infected by Zucchini Yellow Mosaic Virus (ZYMV), Cucumber Mosaic Virus (CMV) and/or Watermelon Mosaic Virus (WMV). AGERI researchers, using a construct with the ZYMV coat protein gene developed by MSU, transformed melon plants (using a local Egyptian cultivar, Escandarani) and evaluated resistance under greenhouse and field conditions at AGERI. The first field trial in March 1999 demonstrates that a majority of transformed plants appeared highly resistant (92-96%) to ZYMV infection, with symptoms of virus infection not appearing until eight weeks post-inoculation.
- Melons were transformed to resist ZYMV at AGERI and these plants have been tested in the greenhouse. AGERI researchers developed a transformation and regeneration system for Shahd EL-Dokki, a local Egyptian cultivar. Two lines were tested through the R<sub>2</sub> generation and a number of plants appeared to be free of virus symptoms at six weeks post inoculation with ZYMV.
- AGERI researchers introduced the ZYMV coat protein gene into cucumber plants using a local cultivar Beit Alpha via *Agrobacterium tumefaciens* transformation. Four lines contain the ZYMV coat protein gene via ELISA and PCR analysis. These lines await further characterization.
- AGERI researchers have also established a regeneration system in watermelon using the Egyptian cultivars Giza1 and Giza2. This work is still in progress.

*Using the training received in the U.S. and constructs from U.S. collaborators, AGERI has, to our knowledge, developed the first transgenic tomatoes and cucurbits within USAID-assisted countries produced by developing country scientists. A number of lines have been field tested at AGERI, and AGERI is currently in active discussions with local industry in how to adapt these materials and/or techniques for the benefit of private sector horticultural interests in Egypt and the Middle East.*

- **Progress in cucurbit transformation.** MSU campus-based scientists focused research efforts on developing a reliable cucumber transformation system that does not require a regeneration step. This work is still in progress, but in the interim, an *Agrobacterium*-mediated transformation system using organogenesis was adapted from the literature and several transgenic cucumbers with various gene constructs were produced. Verification awaits fruit production in the greenhouse and progeny analysis. An MSU international graduate student from Egypt has been instrumental in establishing the *Agrobacterium*-mediated cucumber transformation system and is currently engaged in introducing *Arabidopsis* cold-responsive transcriptional factor genes to confer resistance to cold, drought or salt.
  
- **Potato field trials.** Researchers at MSU and AGERI have concluded the fourth year of field tests of transgenic potatoes with resistance to Potato Tuber Moth (PTM). The researchers have 2 years worth of data on the resistance of transgenic *Spunta* potatoes, a local fresh market cultivar in Egypt. These *Spunta* lines, transformed with a *cryVBt* gene, show strong control of PTM in the tuber (99-100%). Phenotypically, they are similar to untransformed *Spunta*, and should be acceptable to Egyptian consumers and growers. Two years of storage trials have demonstrated that resistance to PTM holds for approximately 2-3 months under ambient storage (using the traditional Nawalla storage system in Egypt) and the results appear long-lasting (over a year) in cold storage. MSU researchers currently have additional lines that will be field tested in early 2001 that will target the Egyptian chip processing industry. During the current year, contacts with private sector potato seed production companies (Pico and American Ag-Tec) were made.

The field tests in Egypt are the most advanced of any trials in the developing world sponsored by the public sector. Future efforts will focus on registration of the materials and developing a resistance management strategy and food safety assessments for the materials in order to commercialize the product. The expertise required for this effort, as well as the costs incurred, are currently being determined. While the research achievements of this project are considerable and are a model for international collaboration in biotechnology, the full impact of this effort will hinge on the difficulty and expense of bringing the transformed lines to the farmers and public. It is unclear how Egypt will develop its commercialization procedures for transgenic potatoes, but if it adopts a stringent European model, it will be difficult for a public-funded effort to meet the regulatory costs.

MSU researchers have also established collaboration with the Vegetable and Ornamental Plant Institute (VOPI) in South Africa (see Technology Transfer section above) and field tests of transgenic potatoes are scheduled for 2001 in South Africa.

- **Progress towards the development of drought-resistant plants in Egypt.** Researchers at AGERI, in collaboration with Ohio State University, have made significant progress towards developing drought-resistant wheat. AGERI scientists established a transformation and regeneration system for wheat and transformed a

number of genes that have been reported to affect drought and salt tolerance. The *mtlD* gene (from *E. coli* and which accumulates mannitol), the HVA1 gene (from barley and which confers delayed leaf wilting), and the fructan gene (from *Bacillus subtilis* and which plays a role in osmotic adjustment to changing environmental conditions) were all transformed into wheat. Early results indicate that the transformed lines are expressing the genes and proteins and, under laboratory conditions, appear to be more salt tolerant than controls. Confirmation of these results await greenhouse and field tests in the future.

- **Progress towards insect resistant maize for Egypt.** The research collaboration between Pioneer Hi-Bred and AGERI has progressed significantly. Important accomplishments include the development of regeneration and transformation systems for elite Egyptian maize lines, coupled with training of four Egyptians in molecular biology, cell culture and transformation and exposure to intellectual property and regulatory issues.
  - **Promoters patented.** Four novel constitutive maize promoters were isolated and a U.S. patent application was filed by Pioneer Hi-Bred with one Egyptian researcher as a co-inventor. The Provisional Patent Application, *Novel Maize Promoters*, was filed with a priority date of October 6, 1998 and a patent was also filed with the European Patent Office. AGERI will have certain rights to the exploitation of these promoters. This collaboration demonstrates how, through negotiation and collaboration, developing country scientists and institutions can develop and access proprietary innovations.

## OTHER ACHIEVEMENTS AND IMPACTS

### ABSP Outreach

- **ABSP profile raised.** One positive outcome of the New Year's Eve arson at the Management Offices of the ABSP was the opportunity to communicate to the general public the need for and goals of the ABSP via television, radio and print coverage. The Director of ABSP gave numerous interviews to various organizations including CBS Evening News, the New York Times, the Los Angeles Times, the Detroit Free Press, the Lansing State Journal, MSU Alumni Magazine and MSU State News, and local radio stations in Michigan. In addition, the Director has been involved in on-campus discussions on agricultural biotechnology and is increasingly asked to speak on agricultural biotechnology and its importance for developing country agriculture. The coverage has been very positive and has raised the profile of the project.
- **MSU Survey raises awareness of project.** ABSP conducted an electronic survey to determine which faculty in departments, institutes and centers at Michigan State University were interested in agricultural biotechnology. An announcement that a faculty biotechnology survey would take place was announced to faculty chairpersons in the fall of 1999, with the actual posting of the survey to take place in February 2000. Due to the destruction by fire of the ABSP offices New Year's Eve, the survey wasn't sent to faculty until April 2000. Faculty were asked to list their technical and policy areas of expertise, research involving biotechnology, if they would like to receive the newsletter electronically and if and how they might like to be involved with ABSP in the future (ie. research, consultancy, training, etc.) Forty-three faculty responded to the survey, far more than expected.



In July 2000, a brown bag luncheon was held for all interested faculty who responded to the survey. The purpose of the meeting was to bring as many MSU faculty together as possible for an informal discussion to explore the role of agricultural biotechnology and international development at MSU and to share their views on what this development should look like in the future. This discussion will be a factor in helping plan a project follow-on program to ABSP Phase I, slated to end in 2002. The meeting was also an excellent vehicle for sharing anticipated USAID priorities with faculty.

The faculty biotechnology survey results will also be used as a source of information on individual faculty expertise and is currently incorporated into the ABSP database. The survey itself will be used as a basis for a wider international survey of international expertise and interest in agricultural biotechnology applied to problems of the developing world.

- ❑ **USAID ListServe generates interest in project within USAID.** It was determined in late 1999 that the USAID biotechnology officer and ABSP would create a monthly electronic listserve to engage USAID in a broader discussion of agricultural biotechnology in order to increase awareness of the issues and opportunities surrounding the technology and to explore new programmatic approaches on a national, regional and global basis. The listserve was targeted to an audience of government officials and agencies, including 45 USAID employees or contractors. The first USAID–Biotechforum Listserve posting was sent electronically in April 1999. Listserve topics posted to date include:
  - Agricultural biotechnology research and commercial technologies
  - Biotechnology and international agreements.
  - Intellectual Property Rights (IPR).
  - An overview of biosafety.
  - Environmental benefit and risk issues for agricultural biotechnology.
  - Human health and food safety issues.
  - Current USAID biotechnology programs and policies.

Additional postings will include the socioeconomic issues surrounding the application of biotechnology in developing countries.

- ❑ **ABSP website, database and LINKAGES newsletter promotes awareness of project.**
  - **ABSP Website.** The Website continued to receive an increasing amount of traffic during the past year. There were 4776 visitors to the Website since August of 1999. The new section on technology transfer should prove useful to website visitors that want to know more about Intellectual Property Rights (IPR), how MSU manages technology transfer and what types of forms are used. Currently, visitors can download the Invention Disclosure Form, the Biologically Active Material Transfer Agreement and an example of a research agreement. Forms are available in both Microsoft Word and PDF formats. Additional forms will be available in the future. Visitors can also link to the MSU IPR Office and to several other tech transfer management sites.
  - **ABSP database.** In late 1997, it was determined that communication and office management would be better served with the creation of an ABSP database of contact information for electronic and postal communications, travel information, conference and workshop management and other information such as areas of expertise for ABSP contacts. The contact records are continually expanded and updated, currently totally 658 contacts.

- **ABSP LINKAGES newsletter.** The first electronic *ABSP LINKAGES* newsletter was distributed in April of 1999 to about 350 contacts. The newsletter is sent quarterly by electronic mail and includes commentary from the ABSP Director, a feature article, and reports from ABSP domestic and international sources on current events and travel in the past quarter. The 2<sup>nd</sup> quarter 2000 *LINKAGES* was distributed to 658 contacts, almost double the size of the first electronic newsletter distribution. Contact email addresses are exported from the ABSP database for each newsletter mailing, which keeps the distribution of the newsletter as current as possible. *LINKAGES* is also posted to the ABSP web site under ABSP News. Unsolicited comments on the newsletter have been very positive. Here is what Richard Sawyer, a consultant and an ABSP External Board member, had to say about the newsletter in September 1999.

"My compliments on the newsletter and the excellent example of linkages that Michigan State University is providing with ABSP towards a global approach to the priorities of food and environment. In a paper I have been asked to present at a AAAS symposium in February (2000), I use the ABSP project as an example of the approach institutions should be taking to address priority problems of food and environment on this planet."

- **AgBiotechNet.** *AgBiotechNet* publishes current information about biotechnology and biosafety for researchers and policy makers worldwide. The site provides rapid and convenient access to research developments in genetic engineering and updates on economic and social issues. The full content on *AgBiotechNet* has been available to users on the Internet since January 1999. ABSP's *AgBiotechNet* subscribers include:

- Zamarano Escuela Agricola Panamericana, Honduras (added in 2000).
- Kenya Agricultural Research Institute, Kenya (added in 2000).
- Institute of Cell Biology and Genetic Engineering, National Academy of Science, Ukraine (added in 2000).
- National Bureau of Plant Genetic Resources, India.
- Kawanda Agricultural Research Institute Library, Uganda.
- Uganda National Council for Science and Technology (UNCST), Uganda.
- Agricultural Genetic Engineering Research Institute (AGERI), Egypt.
- Ethiopian Agricultural Research Organization (EARO), Ethiopia.
- ARC-Roodeplaat V.O.P.I., Republic of South Africa.

*AgBioTechNet* also has subscribers from the following developing country institutions, although not directly supported by ABSP:

- Directorate of Rice Research, Hyderabad, India.
- Institute of Molecular Agrobiology, Singapore.
- Rodouani, Morocco.
- Centre du Biotechnologie, Tunisia.
- Botswana Agricultural College.
- Mauritius Sugar Company.
- University of Namibia.
- ARC Fruit Vine and Wine Research Inst, Stellenbosch, S Africa.
- International Institute of Tropical Agriculture, Ibadan, Nigeria.
- Universidad Autonoma Chapingo, Mexico.
- Universidad Autonoma Metropolitana, Mexico.
- Aracruz Celulose, Brasil.
- Universidad Los Chaguaramos, Venezuela.
- Tamil Nadu Ag Univ, India.
- Directorate of Oil Seeds, Hyderabad, India.
- Ankur Seeds Pvt Ltd, Nagpur, India.
- Commission on Irrigation and Drainage, New Delhi, India.

- Indonesian Sugar Research Institute.
- National Science and Technology Information Service, Thailand.
- Agroinform, Hungary.
- Research Institute for Cereals and Industrial Crops, Romania.

In 2000, *AgBioTechNet* added a Topics Section on their website specifically focused on biotechnology for developing countries. Most of this information is freely available, not requiring a full subscription to the service.

- **ABSP participation in conferences/workshops.** ABSP was the co-sponsor of a very successful conference in Egypt and has participated in many other high profile conferences, seminars and workshops. In addition, ABSP sponsored others to attend workshops and courses on the MSU campus and to other global conferences and workshops. These outreach efforts are an important part of increasing ABSP's visibility within the donor community, government and executive branches and the general public. The following are in date order of attendance.

- Dr. Fred Erbis and Dr. Karim Maredia were invited speakers at the National Biotechnology Seminar and Exposition on Research Results of Biotechnology held August 27-September 24, 1999 in Jakarta, Indonesia. They presented a paper on *Intellectual Property Rights, Technology Transfer and Commercialization of Biotechnology Products*.
- Drs. Josette Lewis, Karim Maredia and Andrea Johanson attended the International Conference on Biotechnology at the World Bank in Washington DC from October 21-22, 1999. Dr. Lewis shared the experience of the ABSP in terms of leveraging partnerships between the public and private sector.
- Dr. Catherine Ives traveled to the Philippines from November 6-18, 1999 to attend an ISNAR sponsored course on Managing Biotechnology in a Time of Transition; to meet with USAID, US Embassy, USDA and other officials stationed in the Philippines; to meet with researchers at the University of the Philippines-Los Banos and to meet with Philippine government officials. She also participated in a press meeting, a radio interview on potential benefits, perceived risks and public acceptance of GMOs in the Philippines and was extensively quoted in Philippine newspapers.
- Dr. Karim Maredia visited the newly created Intellectual Property Rights Unit and the Indian Council of Agricultural Research (ICAR) in New Delhi, India December 20-22. They jointly developed a strategy document on IPR capacity building within ICAR.
- Dr. Karim Maredia was an invited speaker to present a paper on *Capacity Building in Biosafety: Case Study of USAID-ABSP* at the International Workshop on Biosafety and Food Safety of Genetically Engineered Products held February 1-2, 2000 in Jakarta, Indonesia.
- Dr. Andrea Johanson and several ABSP sponsored participants attended biosafety workshops in Italy in March and April. The workshops are presented annually using the case study approach, which is especially helpful to those involved on a day-to-day basis with this complex issue. Dr. Hisham El-Sheshtawy, AGERI, Egypt attended Biosafety 1: Science and Policy in Risk Assessment of Transgenic Organisms. Dr. Johanson and Dr. Mwananyanda Lewanika, National Institute for Science & Industry Research Zambia, attended Biosafety 2: Advanced Research Procedures for Designated Experts.

Dr. El-Sheshtawy and Dr. Lewanika will use the knowledge they gained in helping to develop biosafety regulations, policy and procedures in their respective countries.

- The Commercialization and Utilization of Biotechnology (CUB) Symposium was held May 29-June 1, 2000 in Giza, Egypt with ABSP and the Agricultural Genetic Engineering Research Institute as co-sponsors. Thirty participants traveled to the symposium from the U.S. and Europe including ABSP researchers and administrative faculty and staff from MSU, ABSP sub-contract researchers from several U.S. universities, U.S. government officials, and non-profit and industry representatives. About 40-50 Egyptian researchers, institute and government officials and Egyptian private industry attended the 4-day event. The ABSP External Board of Directors held the ABSP Annual Review Meeting in conjunction with the symposium to view, first hand, the collaborative biotechnology efforts in Egypt. Representatives from the Haas School of Business, University of California-Berkeley were contracted by ABSP and AGERI to perform an in-depth assessment of commercialization and marketing in Egypt to coincide with the symposium. The reports and linkages developed at the CUB Symposium will be used to implement future collaborations with Egypt partners including the major areas of commercialization and marketing of Egyptian genetically modified products.
- **New contacts.** ABSP has recently made linkages to other MSU units of expertise in e.g. economics, food laws, grades and standards. This has served to increase ABSP's linkages to associated issues surrounding the use and commercialization of biotechnology.
- **Grades and standards.** ABSP has linked with MSU's Institute for Food and Agricultural Standards (IFAS). IFAS is an interdisciplinary teaching, research and policy analysis institute focusing on the social, economic, political and ethical aspects of grades and standards creation, enforcement and review. IFAS has taken the lead on the grades and standards assessments (see below under Leveraged funding)
- **International food laws.** Through MSU's National Food Safety and Toxicology Center, ABSP has access to an expanded group of researchers with expertise in food safety issues, as well as the Food Industry Institute that focuses on international food laws and regulations.
- **Cornell and Egyptian company.** The ABSP has facilitated a new link between Dr. Molly Jahn at Cornell University and the Hi-Tech Company in Egypt. This new link between Cornell and a private company will provide an opportunity to transfer virus resistant germplasm of cucurbits crops to Egypt for field evaluation and adaptation trials. The long-term goal is to commercialize cucurbits crops in Egypt that are resistant to virus diseases.
- **Downstream linkages to government and industry.** ABSP's technology transfer activities are expanding linkages with the people and institutions involved in the downstream regulatory issues such as Pest Resistance Management (PRM), and Food Safety. ABSP recognizes the importance of these issues and has built links with the U.S. Federal regulatory agencies such as USDA, EPA and FDA, and with the private companies in the U.S. such as Monsanto and Garst Seed Company to help address these issues. The goal is to develop a clear implementation plan and strategies for addressing the regulatory issues that are critical for commercialization of biotechnology products. This plan hopefully will

become a model for other similar projects and companies trying to commercialize the GM crops in developing countries.

- ❑ **Leveraged funding.** Additional funds for ABSP activities have been leveraged from other USAID sources. No attempt was made during this reporting period to access funding outside of USAID.
  - \$100,000 was received from USAID/Africa Bureau to initiate the collaboration with ASARECA in order to assist them in developing a biotechnology and biosafety cross-cutting initiative in eastern and central Africa.
  - \$100,000 was received from USAID/Africa Bureau to conduct an assessment on the importance of grades and standards to developing a vibrant fruit and vegetable industry in Kenya.
  - Additional funds from various USAID sources (USAID/Africa, Agriculture Trade and Investment Program, and the Office of Population, Health, and Nutrition via Child Survival funds) were solicited in 1999/2000. ABSP was successful in accessing these additional funds, which will be obligated in September/October 2000. More on these projects will be reported in next year's impact report.
- ❑ **Donor coordination.** Increased donor coordination and collaborations with other international groups have been made with the following organizations and donors.
  - **Coordination with United Nations Development Program (UNDP) and International Service for National Agricultural Research/International Biotechnology Service (ISNAR/IBS).** ABSP works closely with UNDP and ISNAR/IBS in coordinating support to ASARECA for the development of a cross cutting initiative in agricultural biotechnology for eastern and central Africa.
  - **Coordination with ISNAR/IBS on biosafety.** Through Dr. Patricia Traynor, ISNAR consultant and ABSP subgrantee, ABSP and ISNAR/IBS work closely on research and assistance programs for scientists and policy makers involved in regulating agricultural biotechnology.
  - **Coordination of Stockholm Environment Institute (SEI).** The SEI, which coordinates the BIO-EARN initiative (Biotechnology, Biopolicy and Biosafety for the Eastern Africa Regional Network), works with ABSP in areas of biosafety regulatory assistance. The Director of ABSP serves on the Steering Committee of BIO-EARN and works closely with this group on the development of IP policy for the program, and in coordinating case studies for training materials in regulatory review.
  - **Coordination with United States Department of Agriculture (USDA).** ABSP, through consultation and as the team leader for an in-country assessment, worked with the USDA in the Philippines to recommend the structure and activities to be funded under a biotechnology program supported by US PL480 funds. This program, funded at \$7 million over five years, will support laboratory infrastructure, short-term training, policy initiatives and commercialization efforts in agricultural biotechnology in the Philippines.